'Mission Operations and Command Assurance: Flight Operations Quality Improvements

Linda L. Weiz
Kristin J. Bruno
Sheri L. Kazz
Sherrill S. Potts
Mona M. Witkowski
Jet Propulsion Laboratory
California institute of Technology
4800 Oak Grove Drive, Mail Stop 125-233
Pasadena, CA 91109
Phone: (81 8) 354-6681
FAX: (81 8) 393-6682

Mission Operations and Command Assurance (MO&CA), a recent addition to flight operations teams at the Jet Propulsion Laboratory (JPL), provides a system level function to instill quality in mission operations. MO&CA's primary goal at JPL is to help improve the operational reliability for projects during flight. MO&CA tasks include early detection and correction of process design and procedural deficiencies within projects. Early detection and correction are essential during development of operational procedures and training of operational teams. MO&CA's effort focuses directly on reducing the probability of radiating incorrect commands to a spacecraft.

MO&CA teams are currently in place on the Voyager, Galileo, Magellan, TOPEX/ POSEIDON, and Mars Observer Projects, and future involvement in the Cassini Project is planned. Over the last seven years at JPL, MO&CA has become a valuable asset to JPL flight projects. Initially brought onto the Voyager Project to research and help correct a surge in command related problems, MO&CA has evolved to become an integral part of project operations. The Magellan MO&CA team, activated just two months prior to launch, was instrumental in aiding in the development of the real-time command process and related operational procedures. This well-structured effort enabled the flight team to function well as a unit and respond quickly to operational anomalies. This transfer of knowledge is still being used in early post-launch to facilitate pre-launch preparations on the TOPEX/ POSEIDON and Mars Observer Projects. MO&CA's pre-launch effort is aimed primarily at reducing operational process deficiencies, thus reducing the amount of post-launch "rework" during operations.

Any space operations process that places human operators into a demanding, high risk environment can benefit from MO&CA's function. This not only applies to mission controllers, working in the "dark room"; but also to flight teams that plan the mission and develop flight sequences, Deep Space Network (DSN) operators configuring and monitoring operations, and engineering teams responsible for analysis.

JPL flight projects have benefited significantly from MO&CA's efforts to contain risk and prevent rather than rework errors. MO&CA's ability to provide direct transfer of knowledge allows new projects to benefit directly from previous and ongoing experience. The MO&CA function at JPL has built quality into mission operations, enabling flight teams to operate efficient y and effectively in a dynamic space flight operations environment. Since MO&CA, like Total Quality Management (TQM), focuses on continuous improvement of processes and elimination of rework, we recommend that this effort be continued on NASA flight projects.

The MO&CA effort is carried out by the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration,